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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/614,244	07/08/2003	Nobuhiro Miki	21776-00052-US	6222
30678	7590	04/10/2006	EXAMINER	
CONNOLLY BOVE LODGE & HUTZ LLP SUITE 800 1990 M STREET NW WASHINGTON, DC 20036-3425			OSELE, MARK A	
			ART UNIT	PAPER NUMBER
			1734	

DATE MAILED: 04/10/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

C4

<b>Office Action Summary</b>	<b>Application No.</b> 10/614,244	<b>Applicant(s)</b> MIKI ET AL.	
	<b>Examiner</b> Mark A. Osele	<b>Art Unit</b> 1734	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 03 February 2006.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 3,4,23 and 26-34 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 3, 4, 23, 26-34 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
  - ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)  | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                                   | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)             |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)<br>Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____  |

## **DETAILED ACTION**

### ***Claim Rejections - 35 USC § 102***

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

2. Claims 3-4 and 23 are rejected under 35 U.S.C. 102(b) as being anticipated by U.S. Patent 4,778,536 (Grebinski). Grebinski shows an apparatus for removing a resist film comprising: means for bringing superheated steam into contact with resist film; means for spraying steam onto the resist film; means for mixing an ingredient for promoting a change in quality of the resist film into the steam, and means for switching the supply from steam alone to steam with an additive to inert gas (column 2, lines 50-64; column 3, lines 24-38; column 4, line 64 to column 5, line 2). Regarding claim 4, the steam is at a temperature range including 100°C (column 4, lines 4-6).

### ***Claim Rejections - 35 USC § 103***

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

4. Claims 26-27, 30, and 33 are rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent 4,778,536 (Grebinski) in view of Kunze-Concewicz. As

shown in paragraphs 2 above, Grebinski shows an apparatus including a chamber and devices for injecting steam with or without an additive onto a wafer with resist on a surface but fails to suggest a spinning mechanism. Kunze-Concewicz shows a substrate cleaning apparatus using steam as the cleaning medium wherein a spinning mechanism is used to spin the substrate, thereby ensuring complete and even cleaning ( column 3, lines 1-20; column 5, lines 45-51). It would have been obvious to one of ordinary skill in the art at the time the invention was made to add the spinning mechanism into the apparatus of Grebinski because Kunze-Concewicz teaches the use of a spinning mechanism in a steam cleaning apparatus for thorough cleaning of an entire surface.

Regarding claim 27, Kunze-Concewicz further shows the nozzle to comprise a line slit nozzle (column 7, lines 1-4).

Regarding claim 30, Kunze-Concewicz teaches the use of a steam boiler, 5, for creating the steam and a connection, 11, for introducing a foreign agent into the steam boiler (column 4, lines 44-49; Fig. 1).

Regarding claim 33, Grebinski further shows a spraying nozzle to spray a gas into the chamber (column 3, lines 39-47, Fig. 2).

5. Claim 28-29 are rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent 4,778,536 (Grebinski) in view of Kunze-Concewicz as applied to claim 26 above and further in view of Lo et al. As shown above, the references as combined show an apparatus including a chamber and devices for injecting steam with or without

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an additive onto a wafer with resist on a surface. Grebinski teaches that additional compositions, including water, can be sprayed onto the photoresist (column 3, lines 30-33, 39-43). Kunze-Concewicz also teaches an additional supply of water being sprayed onto the photoresist (column 6, lines 45-60) but both references fail to suggest the water to be supersonically oscillated. Lo et al. teaches that supersonically oscillated water can remove photoresist from a substrate (column 2, lines 56-66). It would have been obvious to one of ordinary skill in the art at the time the invention was made to add a supersonic oscillator to the water source of the references as combined because Lo et al. teaches the advantages of oscillating water in removing photoresist.

Regarding claim 29, Kunze-Concewicz teaches that a chemical additive can be injected into the steam generator as well as the steam line. It would have been obvious to one of ordinary skill in the art at the time the invention was made to add chemical injectors to both the steam generator and the water line because Kunze-Concewicz teaches that chemical injectors can be added to each of these locations, and using both injectors will ensure a high concentration of the active chemical at the substrate surface.

6. Claim 31 is rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent 4,778,536 (Grebinski) in view of Kunze-Concewicz as applied to claim 26 above and further in view of Franca et al. or Vig et al. As shown above, the references as combined show an apparatus including a chamber and devices for injecting steam with or without an additive onto a wafer with resist on a surface but fail to suggest using an

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ultraviolet lamp. Franca (column 1, lines 33-34) and Vig et al. (column 1, lines 12-22) each teach that processes using ultraviolet light are well known in the semiconductor art to decompose and remove contaminants, including organic contaminants such as resist films. It would have been obvious to one of ordinary skill in the art at the time the invention was made to add the ultraviolet lamp of Franca et al. or Vig et al. into the apparatus of the references as combined to increase the efficiency of the steam stripping device.

7. Claim 32 is rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent 4,778,536 (Grebinski) in view of Kunze-Concewicz as applied to claim 26 above and further in view of daCosta et al. As shown above, the references as combined show an apparatus including a chamber and devices for injecting steam with or without an additive onto a wafer with resist on a surface but fail to suggest using a cooling plate. The reference to daCosta et al. shows a semiconductor wafer holder which has a cooling plate therein (column 1, line 40 to column 2, line 6) and teaches that this cooling plate is necessary to keep the wafer relatively cool, i.e. below temperatures where damage can occur to the workpieces or masking materials (column 1, lines 9-14). It would have been obvious to one of ordinary skill in the art at the time the invention was made to add the cooling plate of daCosta et al. into the apparatus of the references as combined to ensure that the workpiece is not damaged by excessive heat from the steam.

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8. Claim 34 is rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent 4,778,536 (Grebinski) in view of Kunze-Concewicz as applied to claim 33 above and further in view of Schwartzkopf. As shown above, the references as combined show an apparatus including a chamber and devices for injecting steam with or without an additive onto a wafer with resist on a surface. Grebinski teaches that additional compositions can be sprayed onto the resist (column 3, lines 30-33, 39-43) but fails to suggest a source of carbonic acid. Schwartzkopf teaches that carbonic acid is an effective compound for stripping highly cross-linked or hardened photoresist films without producing undesirable metal corrosion (column 2, lines 44-68). It would have been obvious to one of ordinary skill in the art at the time the invention was made to add a source of carbonic acid to be sprayed onto the substrate of the references as combined because Grebinski provides a nozzle for the spraying of additional compounds as desired and Schwartzkopf teaches that carbonic acid is an effective photoresist stripper that does not produce metal corrosion.

### ***Response to Arguments***

9. Applicant's arguments filed February 3, 2006 have been fully considered but they are not persuasive. Applicants argue that the applied art does not disclose an apparatus wherein the resist film is peeled off by an action of the saturated steam. First, it is noted that Grebinski teaches that the saturated steam removes the resist film (column 2, lines 59-66; column 3, lines 55-60). Secondly, method worked upon limitations and method of use limitations are not given patentable weight in an apparatus claim as long as the

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apparatus is capable of performing the method upon those materials. In the instant application, the apparatus shown by Grebinski meets the apparatus limitations of the currently rejected claims.

### ***Conclusion***

10. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

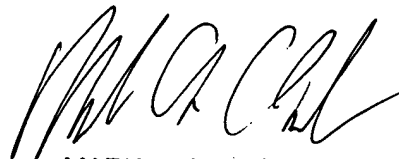
A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

11. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Mark A. Osele whose telephone number is 571-272-1235. The examiner can normally be reached on M-F 9:30-6:00.



If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Christopher Fiorilla can be reached on 571-272-1187. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



**MARK A. OSELE**  
**PRIMARY EXAMINER**

April 6, 2006